IERC

International Electronic Research Corporation
135 West Magnolia Boulevard, Burbank, California 91502
P.O. Box 271 • Area Code 213 • 849-2481

A subsidiary of Dynamics Corp. of America

HERE IS THE INFORMATION YOU REQUESTED

INTERNATIONAL ELECTRONIC RESEARCH CORPORATION IS PROUD TO SEND YOU INFORMATION ON THE LATEST IN OUR COMPLETE LINE OF SOLID STATE TELEMETRY TRANSMITTERS, VOLTAGE CONTROLLED OSCILLATORS AND MIXER AMPLIFIERS.

TRUE F M SOLID STATE TRANSMITTERS WITH ULTRA-STABLE PARAMETERS IN FIVE DIFFERENT PACKAGE OUTLINES; POWER OUTPUTS TAILORED TO YOUR NEEDS, AND INCORPORATING THE LATEST DESIGN AND MANUFACTURING TECHNIQUES TO INSURE THE UTMOST RELIABILITY.

SEND US YOUR STANDARD AND SPECIAL REQUIREMENTS.

LET IERC SUPPLY YOU THE FINEST TELEMETRY EQUIPMENT AVAILABLE TODAY.....

INTERNATIONAL ELECTRONIC RESEARCH CORPORATION

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THE IERC TELEMETRY CAPABILITY

The Telemetry Product Group of International Electronic Research Corporation (IERC) is a proven leader in the design, development, and manufacturing of Telemetry components and systems. The superior technical and manufacturing capabilities of IERC have resulted in a product line that is flexible, accurate, and reliable.

IERC has recently supplied airborne systems and components to the following:

Naval Ordnance Laboratory, Corona, California	Contract No. N123(62738)35429A N123(62738)32322A
Hughes Aircraft Company	Contract No. 04-402709-F12
Edwards Air Force Base	Contract No. AF 04(611)-10188
Kirtland Air Force Base	Contract No. (29-601)65-3278
Jet Propulsion Laboratory	Contract No. CD5-315540
U. S. Naval Avionics Facility, Indianapolis	Contract No. N163-12666(X)
Lawrence Radiation Labs Livermore, California	Contract No. 9738805
University of California San Diego, California	Purchase Order No. ST 613

The attached data sheets show the major telemetry components available from IERC. The components shown provide for complete airborne telemetry systems. Additional components and special modifications are available as well as complete systems design and fabrication.

Some features of the IERC line of solid-state VHF telemetry transmitters (which apply for the extremes of electrical and environmental conditions) are:

- Full compliance with MIL-I-26600, RFI requirements. To our knowledge this is the first production unit available offering this as a standard feature.

- Up to five watts of guaranteed minimum output power.

- Extremely stable frequency and output power.

- Low cost

- High-fidelity modulator, flat from DC to 300 KHz. (Kcps)

- Very low incidental FM noise.

- Completely isolated grounds (Model 447) to eliminate ground loops in external systems.

Some features of the IERC line of Voltage Controlled Oscillators are:

- Operates over the extreme temperature range of -25° C to +100° C while maintaining a stability of 1.0 per cent of band width. (One per cent of B/W from -35° C to +125° C if desired)

- Special bandpass filter design provides distortion-free output: total harmonic distortion and noise is typically 0.2 per cent.

- Due to the unusually sharp filter attenuation at adjacent-channel frequencies, higher input data rates can be utilized without interfering with adjacent channels.

Thorough comparison of characteristics of our latest products will bear out this fact: they represent the highest performance in the industry -- at competitive prices.

IERC TECHNICAL BULLETIN

TELEMETRY PRODUCTS — **MODELS 442/432**

SOLID STATE FM TELEMETRY TRANSMITTER

Model 442 2.0 watts

Model 432 0.5 watts

DESCRIPTION

The Models 442 and 432 are highly reliable True FM, solid-state telemetry transmitters. They provide a minimum output power of 2.0 and 0.5 watts, operating within the telemetry band of 215-260 mc. The units are ultra-stable and maintain constant power over wide temperature and operating voltage excursions. The latest technological techniques in transmitter design are incorporated. Silicon transistors are employed to insure maximum elevated temperature performance and reliability.

FEATURES

- Cylindrical Construction
- Wide Band Response 20cps to 500KC
- Deviation Capability ±300KC
- Output Power Insensitive to Input Variations

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SPECIFICATIONS

Electrical characteristics

TYPE MODULATION	True FM, crystal stabilized
FREQUENCY RANGE	215-260 mc
POWER OUTPUT	Model 442; 2.0 watts minimum under all conditions Model 432: 0.5 watts minimum under all conditions
CENTER FREQUENCY STABILITY	±.01% from −20°C to +85°C; ±.005% on request
INTERFERENCE	Intensity of all undesired output frequencies will be at least 60 db below carrier frequency level
INPUT POWER	Model 442: less than 700 MADC at +32 VDC input Model 432: less than 325 MADC at +32 VDC input
FREQUENCY RESPONSE	Within ±1.5 db from 20 cps to 300 kc
DEVIATION SENSITIVITY	Set at 10 mv rms/kc; other sensitivities upon request
DEVIATION LINEARITY	±1.0% for ±125 kc deviation
MAXIMUM DEVIATION CAPABILITY	±300 kc
INPUT IMPEDANCE	20 K ohms, shunted by less than 15 pf

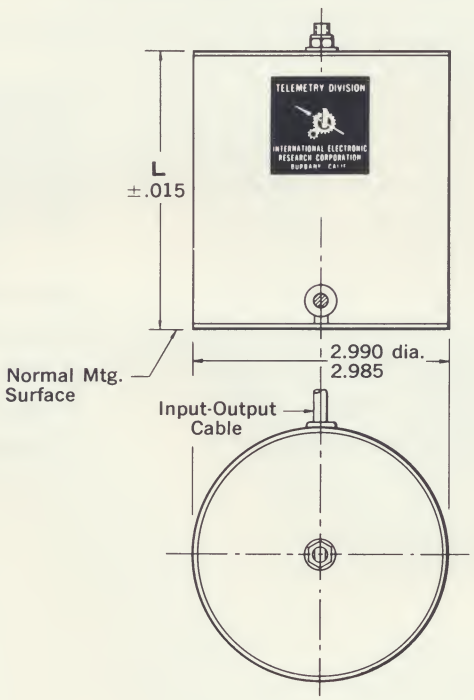
Environmental characteristics

TEMPERATURE	−25°C to +85°C
VIBRATION	25 g to 2000 cps
SHOCK	100 g, 5 millisecond rise time and 11 millisecond duration
ACCELERATION	100 g

Mechanical characteristics

SIZE	See installation drawing
WEIGHT	Model 442: 25 oz. max. Model 432: 15 oz. max.

MODEL 432: L = 1.750
MODEL 442: L = 3.250



Input-Output Cables or Connectors may be Supplied at Either End.

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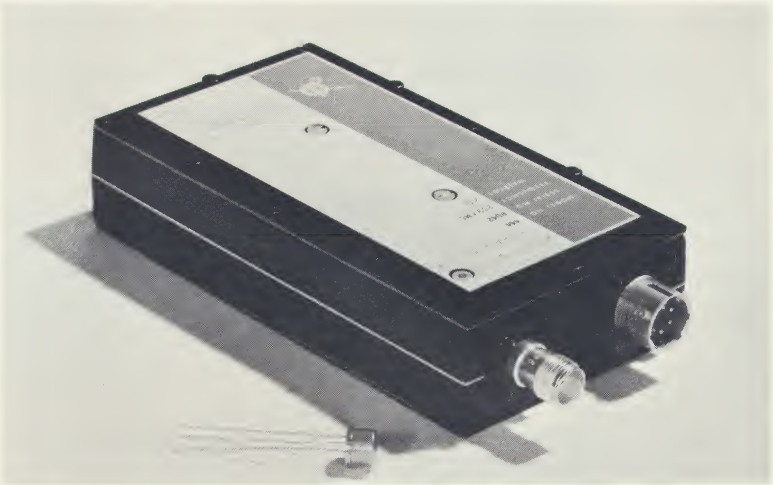
IERC TECHNICAL BULLETIN

TELEMETRY PRODUCTS — **MODELS 444/445**



SOLID STATE FM TELEMETRY TRANSMITTER

Model 444 2.0 watts
Model 445 5.0 watts

DESCRIPTION

The Models 444 and 445 are highly reliable True FM, solid-state telemetry transmitters. They provide a minimum output power of 2.0 and 5.0 watts, operating within the telemetry band of 215-260 mc. The units are ultra-stable and maintain constant power over wide temperature and operating voltage excursions. The latest technological techniques in transmitter design are incorporated. Silicon transistors are employed to insure maximum elevated temperature performance and reliability.

Two modulation inputs are provided; Input No. 1 is direct-coupled to the modulator, providing frequency response which is flat down to DC; Input No. 2 is isolated from input No. 1 by a capacitor to eliminate the response to DC inputs; all other specifications, as listed on reverse side, apply equally for both inputs.

FEATURES

- Meet conducted and radiated RFI requirements of MIL-I-26600
- Wide Band Response DC to 500 KC
- Deviation Capability of ±300 KC
- Low Incidental FM Noise 500 cps maximum

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SPECIFICATIONS

Electrical characteristics

TYPE MODULATION ..... True FM, crystal stabilized

FREQUENCY RANGE ..... 215 - 260 mc

POWER OUTPUT ..... Model 444: 2.0 watts minimum
Model 445: 5.0 watts minimum

CENTER FREQUENCY STABILITY .... ± .01%; ± .005% on request

INPUT POWER ..... Model 444: +28 VDC ±3 VDC at 625 ma maximum
Model 445: +28 VDC ±3 VDC at 1.1 amp maximum
Lower input currents can be supplied in either model

REVERSE INPUT PROTECTION ..... The unit will not be damaged by reversed 28 VDC input

FREQUENCY RESPONSE ..... Input No. 1: Within ±1.0 db from DC to 300 kc (—3 db at 500 kc)
Input No. 2: Within ±1.0 db from 30 cps to 300 kc (—3 db at 500 kc)

DEVIATION SENSITIVITY ..... Set at 10 mv rms/kc; other sensitivities upon request

DEVIATION LINEARITY ..... ±1.0% for ±125 kc deviation

MAXIMUM DEVIATION CAPABILITY .. ±300 kc

INPUT IMPEDANCE ..... 20 KΩ, shunted by less than 15 pfd; other impedances upon request

WARM-UP TIME ..... 3 second maximum

INCIDENTAL FM NOISE ..... 500 cps maximum

INTERFERENCE ..... Radiated and conducted RFI per MIL-I-26600

Environmental characteristics

TEMPERATURE ..... —20°C to +85°C (case temperature)

VIBRATION ..... 20g peak, 30 to 2,000 cps, 5 minute logarithmic sweep in each of three major axes

SHOCK ..... 100g, 11 millisecond ½ sine wave dwell time in each of the three major axes

ACCELERATION ..... Will operate while at 100g acceleration in any axis for one minute

ALTITUDE ..... Unlimited (case not sealed)

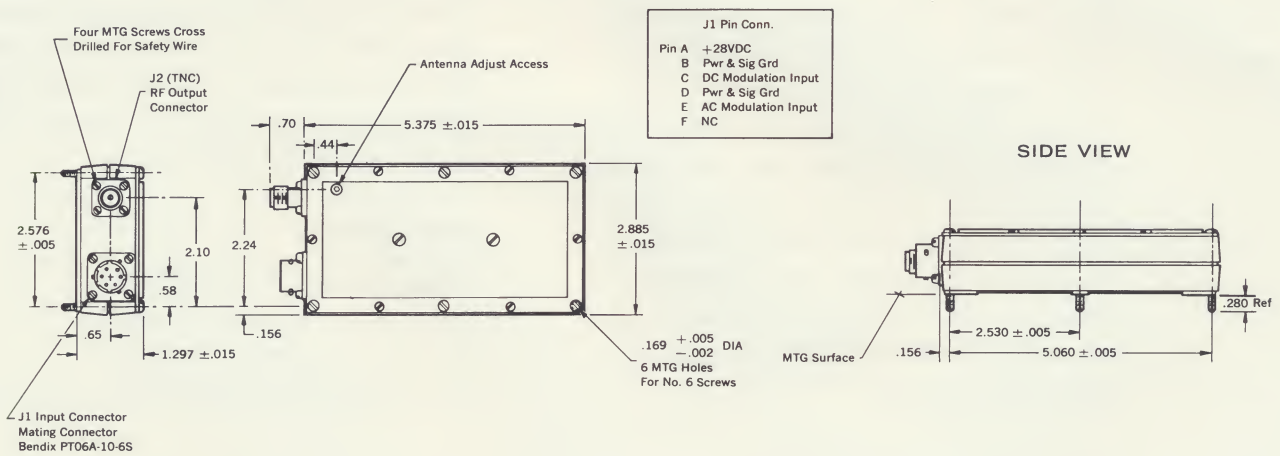
Mechanical characteristics

SIZE ..... 5.39 L. x 2.90 W. x 1.31 H. (maximum excluding connectors)

WEIGHT ..... 20 ounces

INPUT CONNECTOR ..... Deutsch DTK02H-10-6P

RF OUTPUT CONNECTOR ..... TNC



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IERC TECHNICAL BULLETIN

TELEMETRY PRODUCTS — **MODEL 447**

SOLID STATE FM TELEMETRY TRANSMITTER

Model 447 2.0 watts

DESCRIPTION

The Model 447 is a highly reliable true FM, solid-state telemetry transmitter, operating within the 215-260 mc telemetry band, with a minimum output power of 2 watts. The unit's center frequency and modulation characteristics are ultra-stable under all conditions of power input and environment. The output power remains constant over a wide range of temperature and input voltage variations. Silicon solid-state components are employed to ensure maximum elevated temperature performance and reliability.

The Model 447 contains a highly efficient regulated DC/DC converter, which allows all input grounds to be isolated from case ground and each other by a minimum of 100 megohms.

The Model 447 transmitter is designed to comply with all requirements of NASA specification MSFC 50M60230.

FEATURES

- All Grounds Isolated from each other by 100 megohms minimum.
- Meets RFI Requirements of MIL-I-26600.
- Center Frequency Stability of ± .005%.
- Wide Band Response, DC to 500KC.

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SPECIFICATIONS

Electrical characteristics

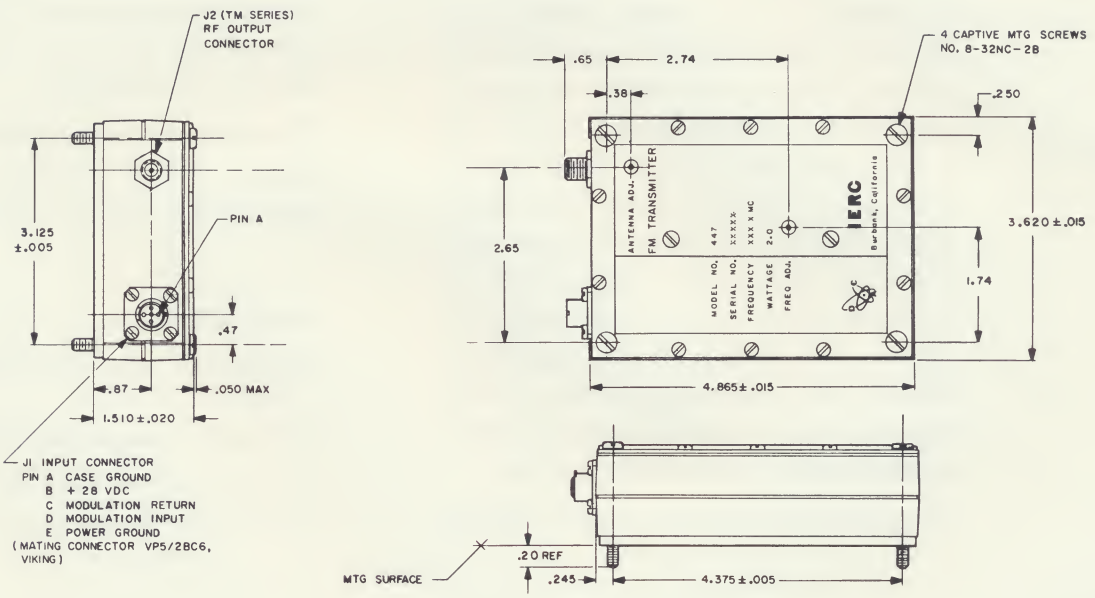
TYPE MODULATION	True FM, crystal stabilized
FREQUENCY RANGE	215 - 260 mc
POWER OUTPUT	2.0 watts min. under all combinations of supply voltage (25 to 31 VDC) and ambient temperature (—20°C to +85°C)
CENTER FREQUENCY STABILITY	±.005% from —20°C to +85°C
INTERFERENCE	Radiated and conducted RFI per MIL-I-26600
INPUT POWER	+28 VDC ±3 VDC at 1.1 amperes maximum
GROUND ISOLATION	Power, signal, and chassis grounds are isolated from each other by 100 MΩ minimum
REVERSE INPUT PROTECTION	The unit will not be damaged by the application of reversed 28 VDC input
FREQUENCY RESPONSE	Within ±1.0 db from DC to 300 kc. (—3 db at 500 kc)
DEVIATION SENSITIVITY	Set at 125 kc per volt rms; other sensitivites upon request
DEVIATION LINEARITY	±1.0% for ±125 kc deviation
MAXIMUM DEVIATION CAPABILITY	±300 kc
INPUT IMPEDANCE	20 KΩ, shunted by less than 15 pf
INCIDENTAL FM NOISE	1000 cps maximum under all conditions
WARM-UP TIME	60 second maximum under all conditions

Environmental characteristics

TEMPERATURE	—20°C to +85°C (Case temperature)
VIBRATION	20g peak, 30 to 2000 cps, 5 min. logarithmic sweep in each of three major axes
SHOCK	100g, 11 millisecond ½ sine wave dwell time in each of the three major axes
ACCELERATION	Will operate while at 100g acceleration in any axis for one minute duration
ALTITUDE	Unlimited (case not sealed)

Mechanical characteristics

SIZE	4.880 L. x 3.635 W. x 1.530 H. (maximum excluding connectors)



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IERC TECHNICAL BULLETIN

TELEMETRY PRODUCTS MODEL 554

VOLTAGE CONTROLLED OSCILLATOR Model 554

DESCRIPTION

The Model 554 is a ruggedized encapsulated unit designed for high-reliability applications. Silicon semi-conductors and precision, MIL-quality parts are used throughout. The circuitry is inherently insensitive to transistor parameter changes; as a result, transistor selection is not required, and the use of a temperature-compensating part is rarely necessary. The long-term stability of the VCO is excellent. The output amplifier/bandpass filter, which restricts undesirable modulation side-current pairs and input signal feedthrough to the output, provides unsurpassed stability of the output-amplitude versus temperature and aging. The transfer function of the output section is synthesized to complement the transfer function of the oscillator section, resulting in accurate modulation response to steady-state and transient input signals, plus low amplitude-modulation.

FEATURES

- Operates over the extreme temperature range of −25°C to +100°C while maintaining a stability of 1.0 per cent of band width. (One per cent of B/W from −35°C to +125°C if desired).
- Special bandpass filter design provides distortion-free output: total harmonic distortion and noise is typically 0.2 per cent.
- Due to the unusually sharp filter attenuation at adjacent-channel frequencies, higher data rates, transients, and over voltages are allowed at the input without causing interference with adjacent channels.

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SPECIFICATIONS

Electrical characteristics

IRIG CHANNELS

1 through 18 and A through E; (Other frequencies and deviations are available on request)

INPUT SENSITIVITY

0 to +5 v, 0 to −5 v, ±2.5 v; others on request

INPUT IMPEDANCE

IRIG CHANNEL	INPUT IMPEDANCE
1 - 18	500K ohms
A - E	250K ohms

INPUT INTELLIGENCE FREQUENCY RESPONSE

Within ±1.0% at a modulation index of 5

ISOLATED OUTPUT IMPEDANCE

47K standard; others on request

OUTPUT VOLTAGE

Adjustable from zero to 4 volts rms open circuit

AMPLITUDE MODULATION

The output voltage will change less than ±5.0% over the total bandwidth

DRIFT

The output frequency will change less than ±0.25% of bandwidth for a period of 8 hours at room ambient conditions following a 10-minute stabilization period

HARMONIC DISTORTION

Total harmonic distortion of the output voltage is less than 1.0% over the total bandwidth. Typical distortion is 0.2%

LINEARITY

The locus of the output frequency versus applied input signal will deviate not more than ±0.15% of total bandwidth from the best-fit straight line

SENSING

The output frequency increases with a positive increase in applied input signal

SUPPLY VOLTAGE

+28 VDC ±4.0 VDC at 10 milliamperes nominal

FREQUENCY STABILITY

A supply voltage variation of ±4.0 VDC, from the nominal supply voltage of +28 VDC, will produce less than ±1.0% of total bandwidth shift in the zero stimulus output frequency, and less than ±1.0% of total bandwidth change in the total bandwidth

Environmental characteristics

TEMPERATURE

The operating range is −25°C to +100°C, (−35°C to +125°C operating range available on special order). The locus of the output-frequency versus applied input-voltage is stable within ±1% of bandwidth (from best reference) for any 85°C change in temperature within the operating temperature range

VIBRATION

Less than 1.0% change in electrical characteristics when subjected to sweep vibration of 0.375 inch double amplitude from 3 cps to 36 cps and 25 g's from 36 cps to 2,000 cps

ALTITUDE

Operating pressure-altitude range is 4.4 atmospheres up to an unlimited altitude

ACCELERATION

Less than 1.0% change in electrical characteristics when subjected to a linear acceleration of 150 g's in each direction along each of three major axes for a period of one minute

HUMIDITY

Will meet or exceed MIL-E-5272

SHOCK

Shock pulses of 5-milliseconds rise time and 11 milliseconds duration, up to 100 g, applied in any axis, produces less than 1.0% change

Mechanical characteristics

SIZE

1.325 inches max. x 0.805 inches max. x 1.605 inches max. (1.7 cubic inches)

WEIGHT

1.7 oz. max.

CONTROLS AND TEST POINTS

Output test point, and adjustments for center frequency, sensitivity, and output amplitude are provided at the top surface of each unit

CONNECTOR

Cannon type DEH-9P

MOUNTING

Mounts to any flat surface with one captive No. 4-40 screw that extends through unit

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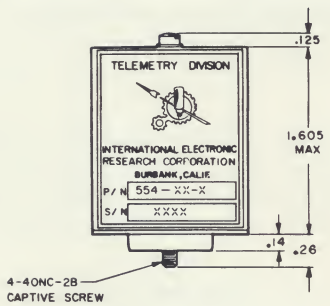

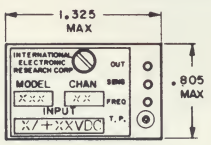

TOP VIEW

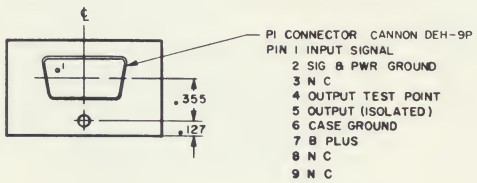

TABLE I		
1ST DASH NO.	FREQ KC	DEV %
1	.40	± 7.5
2	.56	↑
3	.73	
4	.96	
5	1.30	
6	1.70	
7	2.30	
8	3.00	
9	3.9	
10	5.4	
11	7.35	
12	10.5	
13	14.5	
14	22.0	
15	30.0	
16	40.0	
17	52.5	↓
18	70.0	± 7.5
A	22.0	± 15
B	30.0	↑
C	40.0	
D	52.5	↓
E	70.0	± 15

TABLE II	
2ND DASH NO	INPUT
A	0/+5VDC
B	±2.5VDC
C	0/−5VDC
D	0/+3VDC
E	±1.5VDC
F	0/−3VDC

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IERC TECHNICAL BULLETIN

TELEMETRY PRODUCTS MODEL 753

MIXER AMPLIFIER Model 753

DESCRIPTION

The Model 753 is a low-distortion, highly reliable, solid-state feedback device used to amplify the combined outputs of a group of FM subcarrier oscillators. MIL-quality component parts, of proven reliability, are utilized exclusively, and all are operated at a fraction of their ratings. The circuitry has been carefully designed to minimize the number of parts and sensitivity to variations in component parameters. No critical parts, or parts requiring selection during factory test, are required. The unit is encapsulated and sealed for maximum resistance to extreme environments.

FEATURES

- Extremely Light Weight and Rugged.
- Low Output Impedance.
- Low Distortion.
- Wide Frequency Response.
- High Input Impedance.
- High Stability.
- Low Power Consumption.

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SPECIFICATIONS

Electrical characteristics

VOLTAGE GAIN ..... Adjustable from 0.5 to 20

FREQUENCY RESPONSE ..... Within ±0.25 db from 100 cps to 200 kc. Within ±0.5 db to 300 kc

INPUT IMPEDANCE ..... Greater than 100 kilohoms (100 cps to 200 kc)

OUTPUT IMPEDANCE ..... 100 ohms max. at 100 cps; decreasing to 20 ohms max. at 1 kc. 20 ohms max. from 1 kc to 300 kc

OUTPUT VOLTAGE ..... 3 volts rms max. into 10 killohms load

HARMONIC DISTORTION ..... 0.25% max

INPUT POWER ..... +24 to +32 vdc; less than 15 ma

SUPPLY VOLTAGE STABILITY ..... Less than ±1% change in gain, and other electrical characteristics for a ±10% change in supply voltage within the +24 to +32 vdc range

Environmental characteristics

TEMPERATURE ..... Less than ±1% change in gain, over the ambient temperature range from −20°C to +90°C at any frequency from 300 cps to 100 kc

VIBRATION ..... Less than 1.0% change in electrical characteristics when subjected to sweep vibration of 0.375 inch double amplitude from 3 cps to 36 cps and 25 g from 36 cps to 2000 cps

ACCELERATION ..... Less than 1.0% change in electrical characteristics when subjected to a linear acceleration of 150 g in each direction along each of three major axes for a period of one minute

HUMIDITY ..... Will meet or exceed MIL-E-5272

SHOCK ..... Shock pulses of 5 milliseconds rise time and 11 milliseconds duration up to 100 g, applied in any axis, produces less than 1.0% change

ALTITUDE ..... Unlimited

Mechanical characteristics

SIZE ..... 1.325 inches max. x 0.805 inch max. x 1.605 inches max. (1.7 cubic inches)

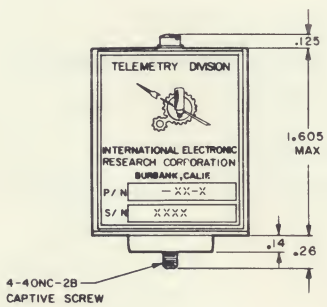
WEIGHT ..... Less than 1.5 ounces

MOUNTING ..... Mounts to any flat surface with one captive No. 4-40 screw that extends through the unit

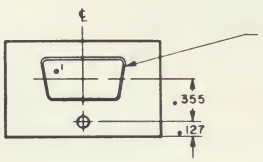
CONTROLS ..... Gain control on the top surface of unit

TEST POINTS ..... Output test point is provided.

MATING CONNECTOR ..... Cannon type DE-9P



FRONT VIEW



BOTTOM VIEW

PIN CONNECTIONS	
Pin No.	FUNCTION
1	N.C.
2	Sig. & Pwr. Grd.
3	N.C.
4	N.C.
5	Signal Input
6	Case Ground
7	Supply Voltage
8	N.C.
9	Output

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